Advancing U.S. Competitiveness in Scientific Research & Education: Innovations at NSF

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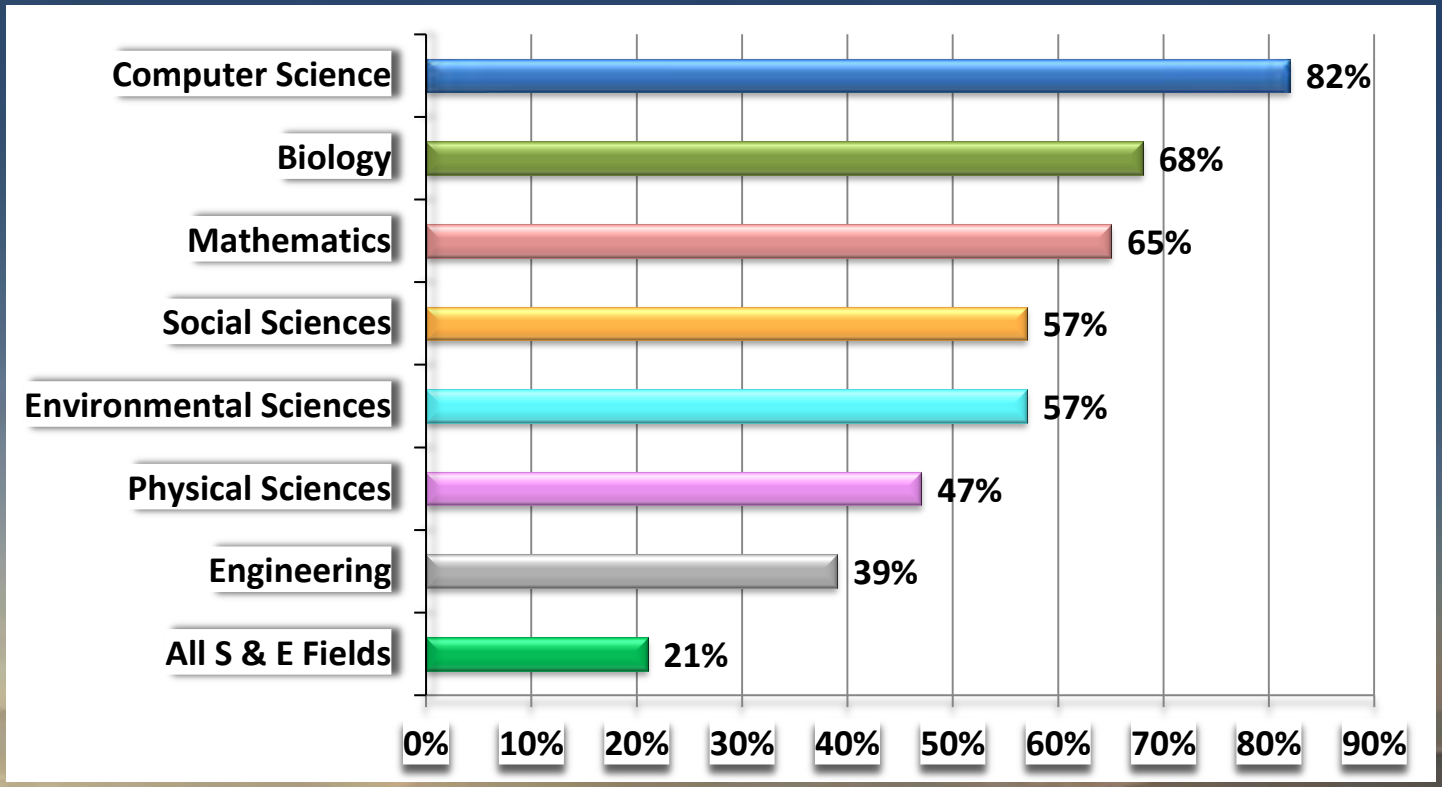
NSF's Role in U.S. & Global S&E Research Enterprise

- **Annual budget about $7 billion, ≈ 94% to funding programs**
- Funds basic research across all S&E fields & STEM education research
- In 2011, provided support for about 300,000 researchers
  - Balance between individual scholarship and "big facilities"
  - Fund the best people and the best ideas
- **201 Nobel laureates received NSF funding since 1951**
  - 70% of all U.S. Nobel laureates since 1951
  - 47 Nobel laureates in economics
  - 40 NSF Graduate Research Fellowship winners are Nobel laureates
- **Industrial, economic, and societal impact**

NSF by the Numbers

NSF Support of Academic Basic Research In Selected Fields

(as a percentage of total federal support in 2009)

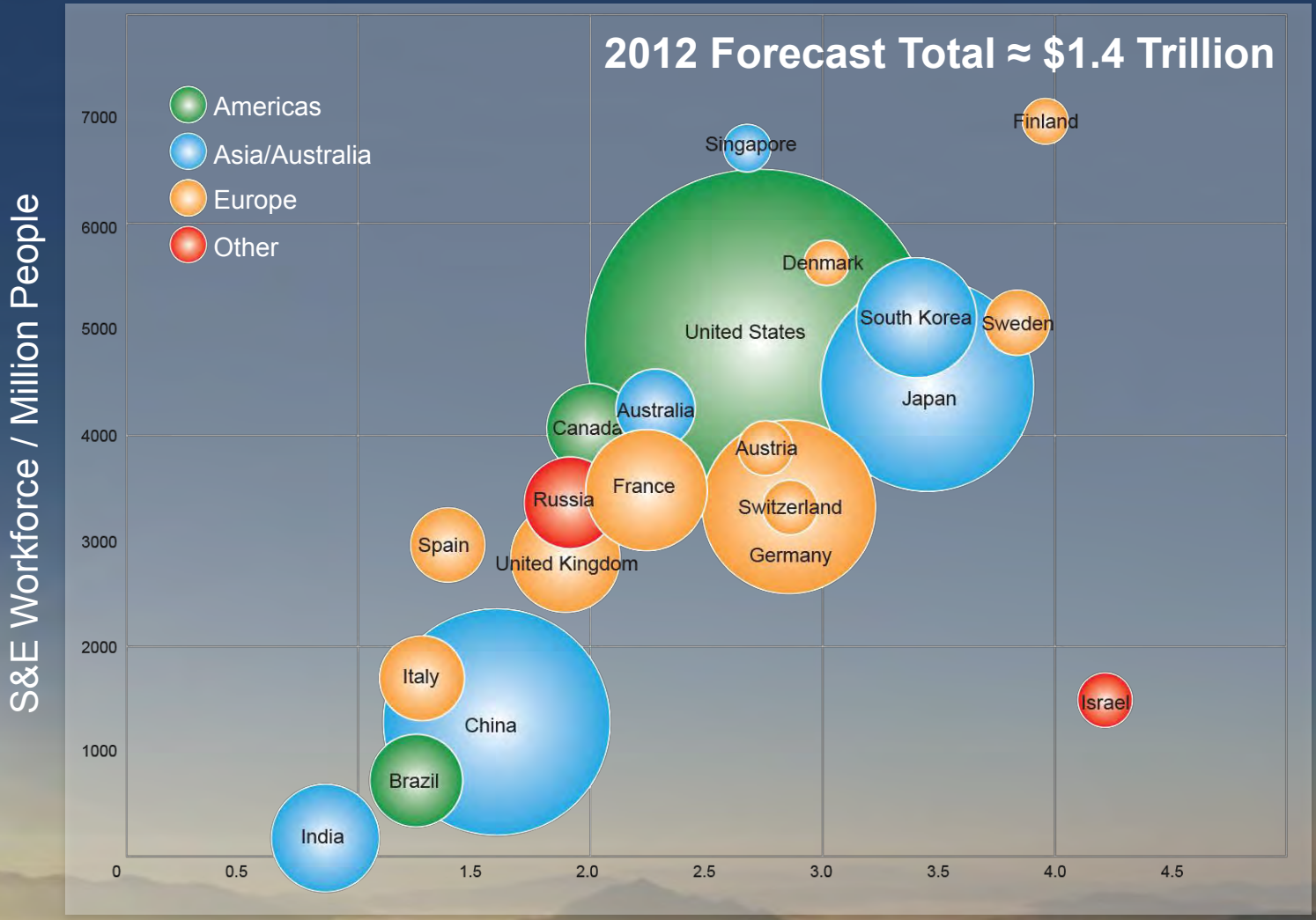


Source: NSF Survey of Federal Funds for Research and Development

Key Trends of the New Era

- Global Challenges Need Global Solutions
- Borderless Knowledge Enterprise
- Shifting Demographics
- Shifting Economics

Investments and Human Capital – Global R&D 2011



Adapted from: Battelle, *R&D Magazine*, International Monetary Fund, World Bank, *CIA World Factbook*, OECD

Intellectual Drivers in the New Era of Science & Engineering

New Era of Observation

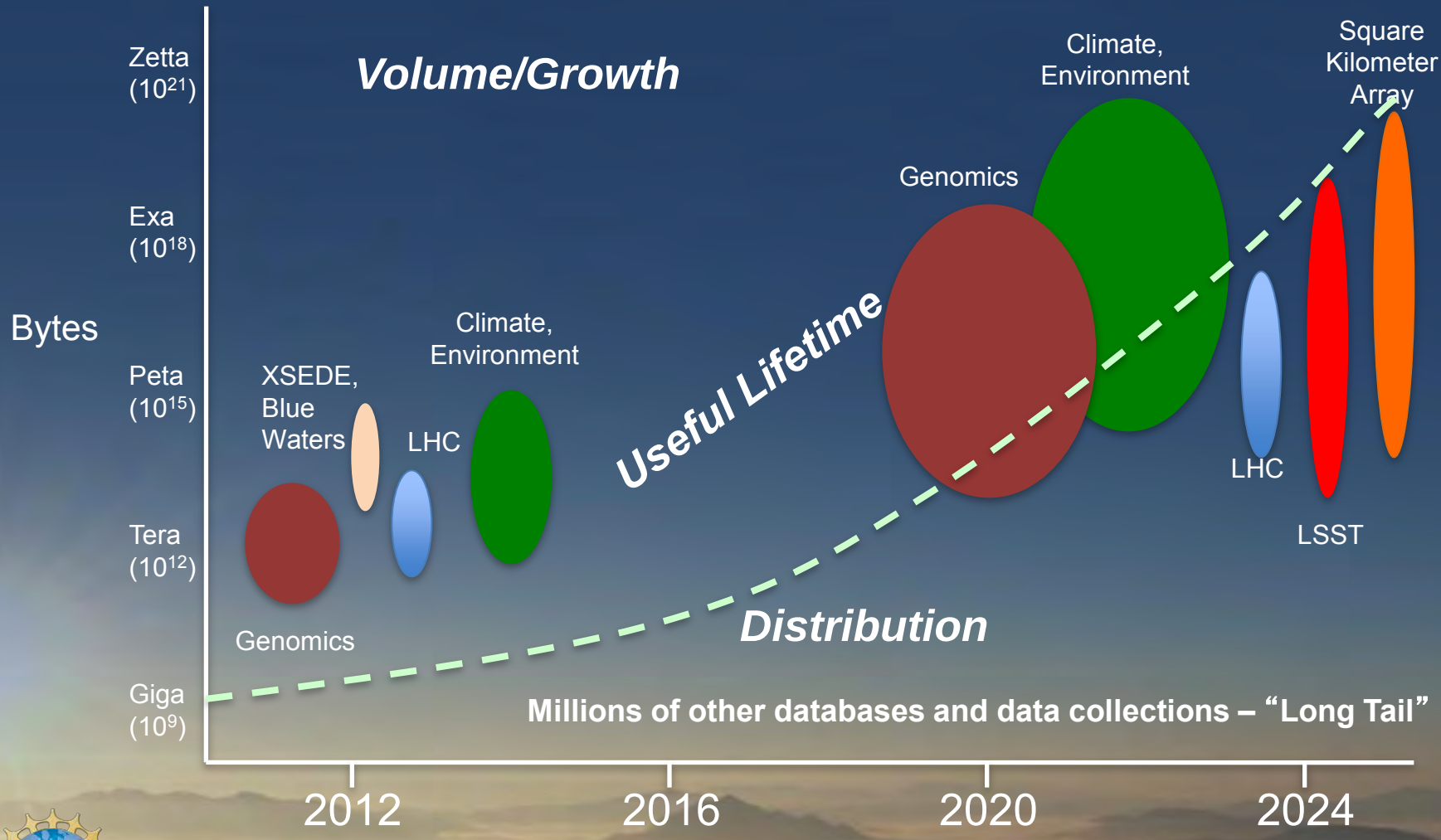
Credit: National Science Foundation

Intellectual Drivers in the New Era of Science & Engineering

New Era of Data & Information

Credit: US Ignite

“Big Data” Challenges Today’s Infrastructure

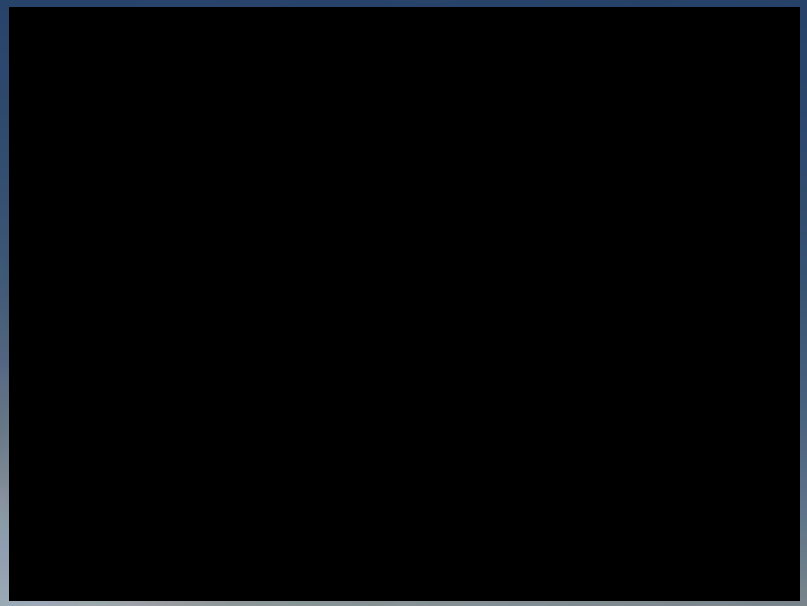


Science & Engineering in the Arctic

NSF R/V Sikuliaq launched October 13, 2012

Credit: Yale Climate Forum

Science & Engineering in the Antarctic



Credit: National Science Foundation (left and right)

NSF World-class Facilities & Instruments

HIAPER

NCAR Wyoming Supercomputing Center
Opened on October 15, 2012

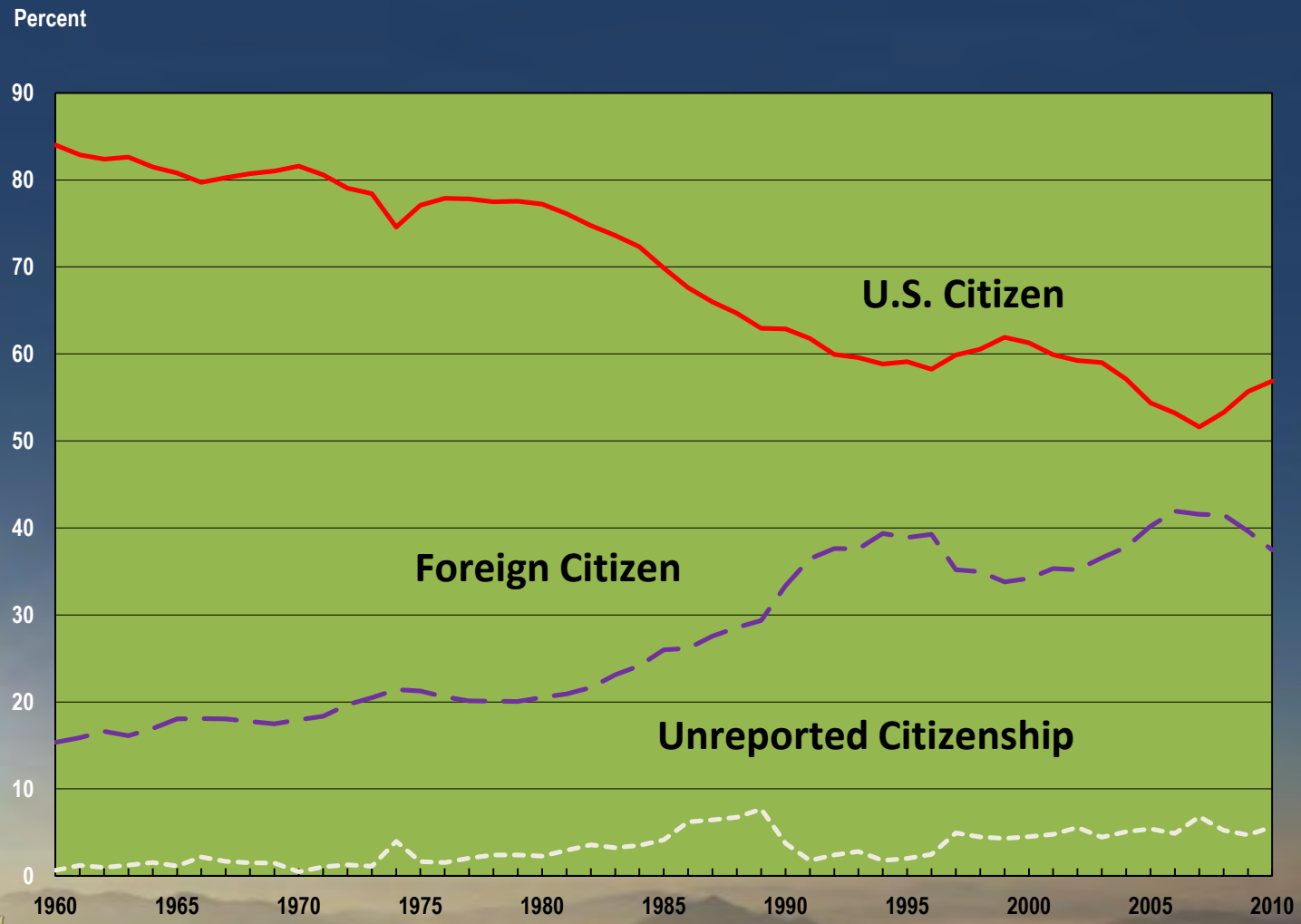
Credit: UCAR/Geoffrey Haines-Stiles (left); Lila Films, Inc. (right)

INSPIRE - Integrated NSF Support Promoting Interdisciplinary Research and Education

40 new awards amounting to $30 Million
Launched July 2012

Creating a culture of collaboration, innovation, risk-taking, and experimentation

U.S. S&E PhDs Awarded (1960–2010)



SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Earned Doctorates.

NSF Career-Life Balance Initiative

Launched September 26, 2011

NSF Investments in Graduate Students:

- In 2013, NSF will support about 42,000 graduate students for ~ $1 billion.
- In 2013, ~ 6,000 NSF GRFs
- Principled commitment to support future workforce
- New global opportunities: NSF *GROW*

Graduate Research Fellowship Program

60th Anniversary GRFP
NSF GRADUATE RESEARCH FELLOWSHIP PROGRAM

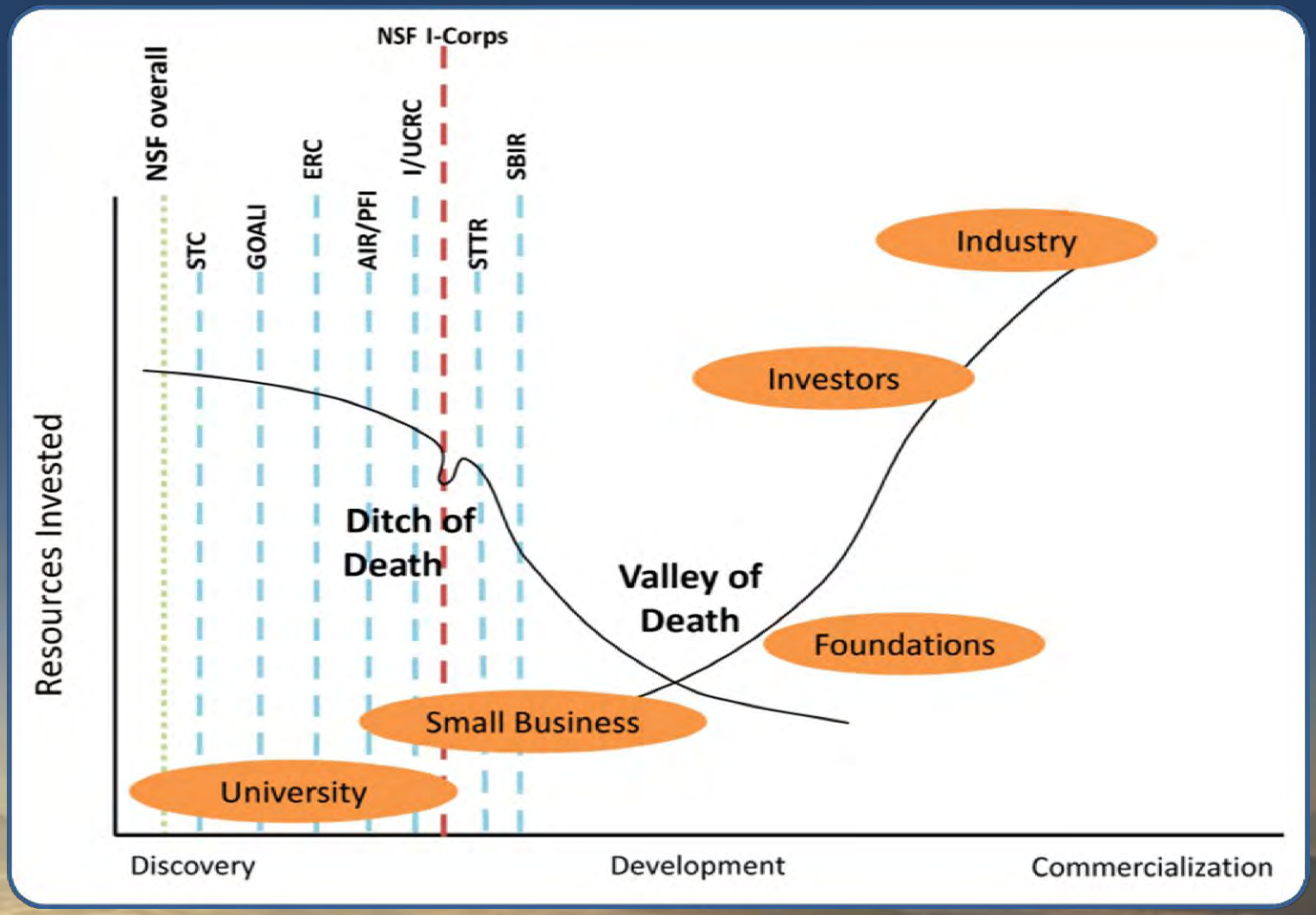
Launched December 5, 2012

SAVI: Science Across Virtual Institutes

Launched October 5, 2011

- 17 new programs introduced in the past year
- Early Career SAVI with ERC

Nurturing the Innovation Ecosystem



Innovation Corps (I-Corps)

Launched July 2011

- 100 projects supported in FY 2012
- 200 new projects in FY 2013
- 5 National Hubs
- Educational Opportunities for Grad Students

Credit: Thinkstock

Credit: National Science Foundation

PEER: Partnerships for Enhanced Engagement in Research

Launched July 7, 2011

42 projects supported in 2012

A Step Toward Harmonizing Global Science & Engineering

GLOBAL RESEARCH COUNCIL

Launched at NSF in May 2012

"Good science anywhere is good for science everywhere"
Science, May 25, 2012

Next GRC Summit in Berlin*
(May 2013)

* Co-organized by Brazil and Germany

GLOBAL RESEARCH COUNCIL

Topics for collective action:
Research Integrity
Open access to publications and data

Credit: Thinkstock

New Initiatives at NSF Impacting Graduate Education

- Interdisciplinarity
  - **INSPIRE, SEES**
- Innovation and Entrepreneurship
  - **I-Corps**
- Inclusiveness and Broadened Participation
  - 32 programs (eg, GRFP, Bridge to the Doctorate, STCs, ERCs, IGERT, **AGEP 2**.0)
- International Engagement and Collaboration
  - **SAVI, USAID-PEER, GROW**
- Information Technology Infrastructure
  - **CIF-21**
- Intellectual Capital and Workforce Development
  - **GRFP, IGERT (CIF-21 Pilot), I-Corps**

Credit: National Science Foundation